



Government Computer News

Inside Job



Closer inspection of packets becomes critical to protecting networks against agile threats

INSIDE

How Primitives Can Move Enterprise Architecture Into the Future

PAGE 25



Government Computer News

CYBERSECURITY

20 CLOSE INSPECTION

Securing IT systems these days means continuous monitoring on the back end and a closer look at the traffic moving across networks on the front end to provide real-time situational awareness. Deep packet inspection can help keep new threats at bay, if your network is fast enough to handle the load.

ENTERPRISE ARCHITECTURE

25 PRIMITIVES AND THE FUTURE OF SOA

DOD's Business Transformation Agency is using Primitives — the basic elements of system architecture — to help develop a common vocabulary for system design, which could make the development of service-oriented architectures faster and less expensive, not to mention less confusing.



INTERVIEW

28 COL. EARL NOBLE

Army Knowledge Online's project manager talks about AKO's efforts to add capabilities for mobile users through its Go Mobile program and the importance of federated search during the transition to a single enterprise portal for the Defense Department.



GCNLAB

12 A PLACE FOR EVERYTHING

Six personal databases tested by the Lab all cover the basics, but then their features diverge. How to tell which one is right for you? Start with these five principles for evaluating them.

18 GCN LAB IMPRESSIONS

Big Blue thinks small, and mobile; BlackBerry has an app for feds; tablets and e-readers turn the page.

7 UPDATE

Massachusetts gets tough on data security. • Yes, it's time to think about IPv6. • The Numerator. • Technicalities. • Technical Difficulties. • NewsLinks.

COMMENTARY

4 EDITOR'S DESK

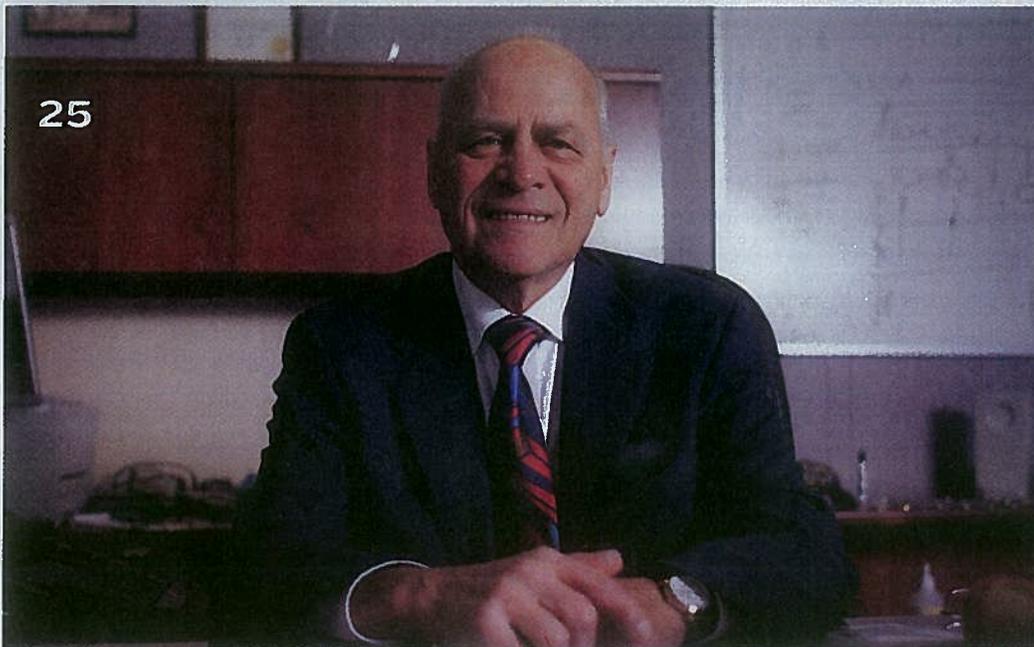
By Wyatt Kash
With ProjectForge, DISA blazes new trails in cloud computing and collaborative software development.

30 INTERNAUT

By Shawn McCarthy
The Web in 10 years

34 CYBEREYE

Put public safety first
By William Jackson



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of data might have various names in different places.”

The music example is the ultimate illustration of how a common vocabulary would work in a network-centric environment, McCormack said. “An A sharp is the same everywhere. You would be able to pass information and data simultaneously between different services.” And there wouldn’t be a need for mediation between an organization’s data architecture and business architecture.

However, that is the optimal stage, and both DOD and civilian agencies are working toward that goal, McCormack said.

Standard Formats

The Department of Defense Architecture Framework 2.0 is the foundation for architecture Primitives. Primitives are a standard set of viewing elements and associated sym-

bols mapped to the framework’s Meta-Model concepts and applied to viewing techniques.

Primitives provide standard formats for diagrams, data that represents the diagrams, and data that moves within and between the realities those diagrams represent, Wisnosky said. Primitives are elements of modeling techniques specific to a given perspective, such as a process model, data model or business rules model.

BTA is applying Primitives based on Business Process Modeling Notation, a graphical representation for specifying business processes in a workflow. The Object Management Group maintains BPMN.

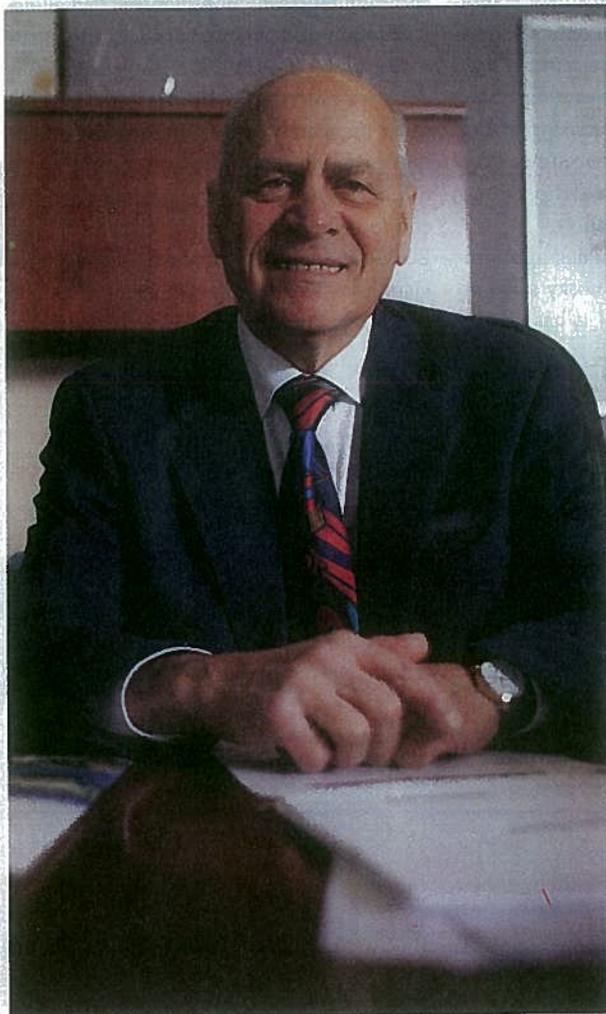
The idea of Primitives fits nicely into service-oriented architecture, Wisnosky said. SOA represents the first time in the information technology world where it is clear how IT and business fit together, he said.

So an SOA pattern made up of Primitives that are associated with business processes could execute those business processes with standard services.

“For example, ‘authenticate user’ is a standard service that is used in every single Web application,” he said. Under “authenticate user,” there are other standard services, such as “verify me” and “verify password,” Wisnosky said. “So, ‘authenticate user’ is a standard service that we would only have to write one time.”

“But what if this ‘authenticate user’ was described by me with a square, by you with a circle, and [by another designer] with a diamond?” Wisnosky asked. “We would have to explain what we meant by that and explain what it does.”

However, if “authenticate user” is the same symbol every single time, the software inter-



BACK TO BASICS:

The Origins of Primitives in IT A

Dennis Wisnosky, chief technical officer of the Defense Department’s Business Transformation Agency, has been at the forefront of efforts to develop a unified vocabulary that will make it easier for business users to describe their requirements to systems architects and designers. With a better understanding of those requirements, designers and engineers can use best practices and basic building blocks known as Primitives, a common language and design patterns, to build the systems that users actually need, reducing costs, duplication and waste. But how do we understand Primitives and their role in building next-generation systems based on service-oriented architectures? GCN spoke recently with Wisnosky about the primordial origins of Primitives.

— Rutrell Yasin

GCN: What is this concept of Primitives?

Wisnosky: My background is in physics. As a physicist or chemist or scientist, we learn basic principles. And one of those principles is what things are made of. They are made up of elements. There are only 117 that we know of. With those 117 elements in the Periodic Table of Elements, we can make anything that we want to make or discover anything that God has made. Water is two hydrogens and one oxygen. That is pretty simple. We can’t get along without it. Air is only O (oxygen). Those are primitives, those are basic building blocks. We can subdivide them further for science purposes, but for all practical purposes in life, we get along with 117 elements.

How does this tie into enterprise architecture and service-oriented architecture?

In this business, [what] we call ar-

ZAIN HAMID

preting a model knows immediately to go to authentication services because those services are based on SOA standards internally.

"We know exactly what the payload of the information coming in must be, so we go to translate it, and we know exactly what has to go out to the next service," Wisnosky said.

All businesses and government agencies have that problem, he said. "So this concept of Primitives applies to anyone building business process models or doing service-oriented architectures."

Another aspect of Primitives is a common vocabulary. DOD's multiple data environments inhibit sharing and reuse of applications and integrated user contribution.

"Once we started to do Primitives, which are the symbols and the meaning of the symbols, we began to discover different meanings of the words we use to describe these symbols

and what the symbols are describing to the business processes," Wisnosky said.

"We have a project called the Common Vocabulary Project — some might call it building ontology — to agree on the meaning of words that we use," he said.

Within DOD, the Business Enterprise Common Core Metadata Community of Interest is responsible for establishing a common vocabulary for terminology such as units of measure and purchase request numbers, he said.

Applying Primitives

Use cases that demonstrate how Primitives can be applied in real-world situations are being developed and will be used to drive pilot programs.

For example, Joint Close Air Support (JCAS) with Army Central Command in

Kuwait is applying Primitives to aid in teaching personnel their part in the larger process of managed close air support. The unit also uses Primitives to automate the process as much as possible, Wisnosky said.

Primitives can help teach people because they describe a process flow model that is easier to read than instructions in a book, Wisnosky said.

For JCAS, applying Primitives and a common vocabulary simplified communication among domain experts, architects and modelers. In addition, it helps in the selection and development of services to support the exchange of messages from system to system.

Using architecture Primitives, "we will be able to greatly reduce the cost of building and maintaining of architectures and greatly reduce the cost of data transformation and mediation between systems," Wisnosky said. ■

chitecture

chitecture [is] applied to business processes — not the kind of architecture we use to build buildings. We've allowed the practitioners of this art to build three or four expressions of architectures.

The same way you go to the Metropolitan Museum of Modern Art, you see modern art that is an abstraction of what is in someone's head. It means nothing to anybody else, only to that artist. But it means nothing to me. Now you try to tell a story with the abstractions of several artists and those stories, again, are meaningless. Two different people wind up with five different stories. On the other hand, take a realist, a person who paints something we would recognize, like a house, maybe more than one story, but there would be agreement on the basic principles to describe this house, like a door, windows, for example.

So that is what I am talking about with respect to Primitives: getting

the business process architectures so that they are described in a way that the meaning of this architecture, the business process that they described, is absolutely clear to the most number of people.

How did you get into this?

We were building a business enterprise architecture when the whole team changed because the contract [that the work was being performed under] was won by different people. It was a fair-and-square open competition. The company that had been doing this for five years didn't win. The new company came in and, all of a sudden, their people had different ideas for how the architecture should be built. They wanted to rebuild it their way.

Their way might have been a good way, but we had already invested hundreds of millions of dollars in another way, and it seemed to be a wiser course of

business action to get these new people to learn the old way. That is when I began thinking about why this is so hard. What if we had reduced the number of elements of our periodic table into some finite number that we can all agree with? Like what's a box? What is an arrow? What is a joint? What is a decision?

I started to talk to the engineers that know this kind of stuff when I was giving talks. I set up some search for a solution like resistors and capacitors electrical engineers would use or like pumps and pipes a plumbing diagram might have on it. I talked about these concepts and [said] I don't know what these things are going to be called; I suppose they are just Primitives. They are the smallest symbol we can use.

There is nothing smaller we can think of that can describe our business practices. But for all practical purposes, the Primitives are all

that we need to build a model and these are business process models.

Did they exist somewhere?

We didn't have to reinvent them. Someone proposed Business Process Modeling Notation. I discovered there are several groups around the world who did extensive studies on BPMN and its underlying science, and they didn't agree with one another. So we said stick with BPMN but look at the kind of models we build, and let's limit the use of BPMN to those that we decided were necessary.

For example, we use helium in balloons, even though hydrogen is slightly better, but it has one problem: It explodes. So we throw away that hydrogen element and focus on helium. That is what we have done here with Primitives, we've thrown away those that are explosive and don't work. We use only the ones that work for us. ■